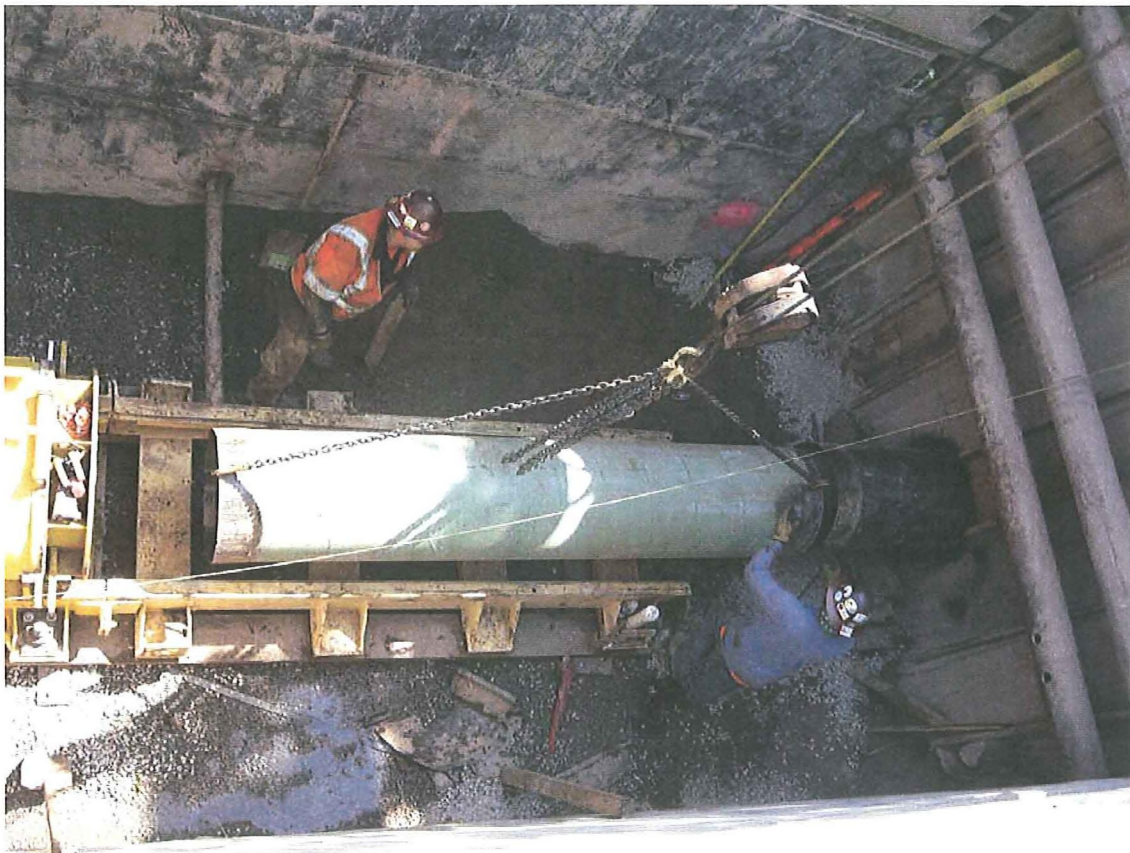




SANITARY SEWER SYSTEM REPORT 2011-12



NOVEMBER 2012

City of San José
2011-2012 Sanitary Sewer System Report

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EXECUTIVE SUMMARY

This Sanitary Sewer Report summarizes the various capital investments and asset management activities associated with the sanitary sewer collection system for FY 2011-2012 and planning for FY2012-2013.

The following highlights the Sanitary Sewer Capital Improvement Program:

- ***Neighborhood Sewer Rehabilitations***
 - Decreasing Sanitary Sewer Overflows (SSO's)
 - Providing reliable sewer service
 - Verification of active connections/sewer lateral repairs
 - Verification of flow conditions
- ***Condition Assessment***
 - 10-year plan to inspect the entire collection system
 - Locating and repairing problems prior to a spill
 - Sewer assessment using recognized assessment criteria
 - Results of condition assessment guide the investments in the collection system
- ***Interceptor Management***
 - 28 miles of large diameter, parallel pipelines (60-inches to 90-inches)
 - 7 intermediate junction structures to allow for interceptor isolation/inspection
 - Coordinate interceptor operations with the Water Pollution Control Plant
 - Summer versus winter flow management options
 - Odor control structure maintenance
 - Interceptor Master Plan consists of 7 project phases (WPCP to downtown)
 - Phases 1 through 5 are completed; Phase 6 is in final design
- ***Master Planning***
 - Supports economic development by ensuring adequate capacity
 - Complex computer flow model of pipes 10-inches in diameter and larger
 - Active flow monitoring helps to calibrate the model
 - On-going capacity analysis verifies system operations
 - Identifies capacity needs based on existing users and future growth
 - Identifies existing deficiencies and potential future capacity projects

I. BACKGROUND INFORMATION

The City provides sewer services for the residents and businesses of San José and surrounding areas. The City owns and operates the sewer collection system consisting of approximately 2,250 miles of sanitary sewer mains (which vary in size from 6 inches to 90 inches in diameter), including 10 miles of force mains, 15 pump stations and 45,000 manholes. There are over 202,000 privately owned laterals which connect to the system. The collected wastewater is conveyed to the City's Water Pollution Control Plant (Plant) by major interceptor pipelines located in the northern part of San José. The City's sanitary sewer collection system benefits from the generally uniform topography of the Santa Clara Valley which allows the majority of

the waste water flows to be conveyed to the Plant using gravity sewer lines with minimal use of lift stations and force mains.

Approximately 85 percent of this system is comprised of local collector pipes that are 10 inches or less in diameter. In addition, the majority of the collection system (85 percent) was constructed between 1950 and 1980. It is in these pipes where majority of the sanitary sewer overflows (SSOs) are occurring.

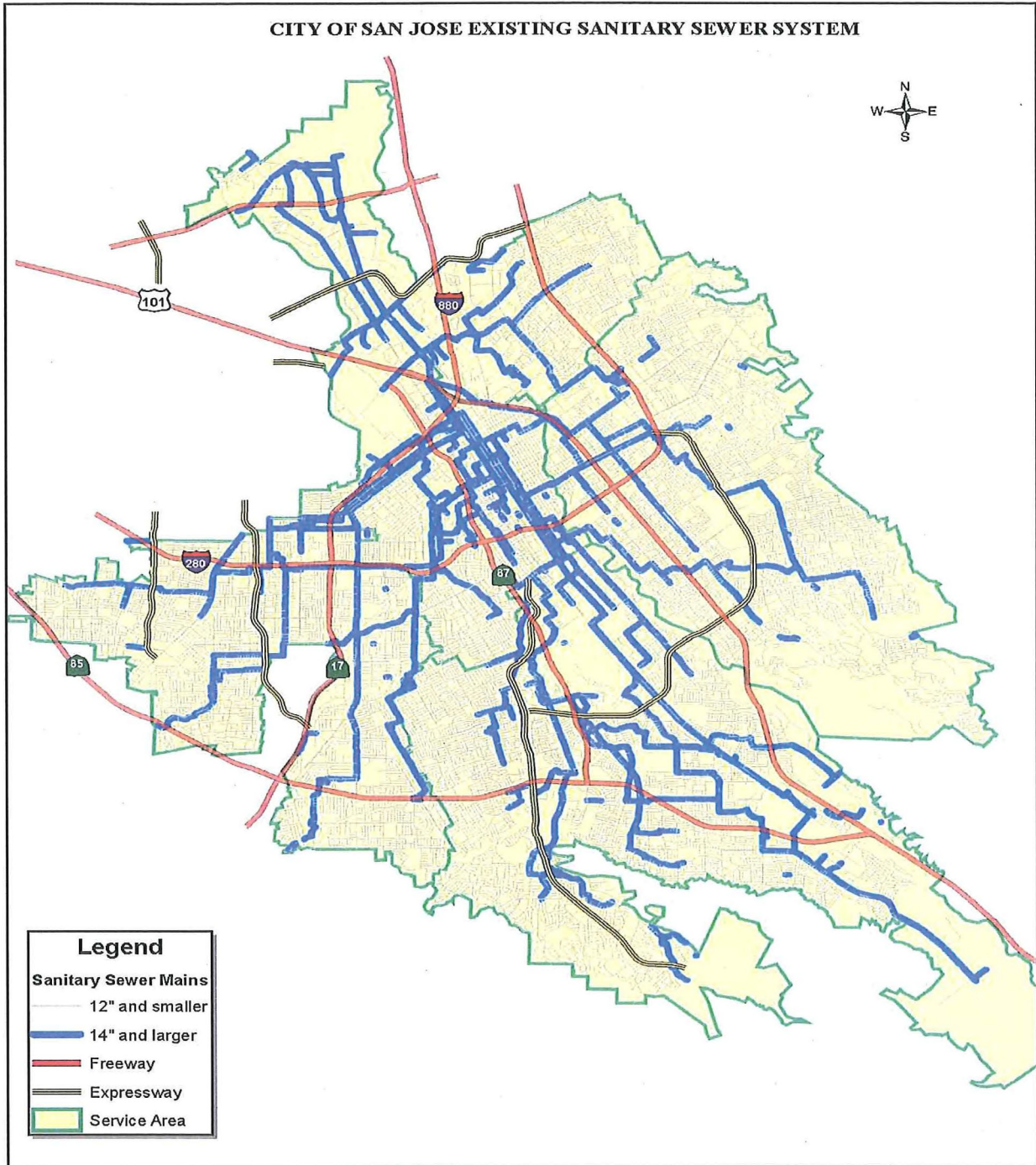


Figure 1

II. NEIGHBORHOOD SEWER REHABILITATION

On call contracts and urgent sewer repair contracts have been implemented to respond to urgently needed repairs to the system. During FY11-12, approximately \$4 million has been expended for this effort. The challenges staff and contractors face delivering these types of projects include limited access due to sewers constructed in easement areas (backyards or on hillside) and lack of record drawing or as-built information.



Contractor repairing sanitary sewer in backyard easement

III. CONDITION ASSESSMENT

Collection system

Initiated in 2010, the Sanitary Sewer Condition Assessment (SSCA) Pilot Project collected a representative sample (approximately 2% or 250,000 linear feet of pipe) of the overall condition of the entire City's sanitary sewer system. The project resulted in a collaborative report of the Sanitary Sewer Condition Assessment Program prepared by Carollo Engineers and City staff in June 2011.

The SSCA Pilot project used closed circuit television (CCTV) to video inspect and collect data on the physical condition of the pipes. The results of the project indicated that 25 segments out of approximately 1,000 segments inspected were determined to need immediate rehabilitation. A repair project is in progress to repair those segments to prevent further deterioration.

There are two current projects as a part of the SSCA Program that will CCTV one million (1,000,000) feet of sewer mains that are within 200 feet of creeks/rivers and approximately 450,000 feet in high SSO incident areas in east San José. In the near future, another project will CCTV and repair approximately 230,000 feet of pipes in high SSO incident areas located in west San José.

Overall, the program is continuous and requires an annual investment of \$2 million for the Condition Assessment Program for 10 years. As of November 2012, 170 miles (7.5 percent) of the system have been inspected.

Pump Stations

As stated in previous annual reports, the average age of the City's 15 sanitary sewer pump stations is approximately 35 years old. These facilities are listed in Table 1 and the locations shown on Figure 2. The standard design-life of the mechanical and electrical components of a pump station is 10 to 25 years. It is reasonable to expect that a pump station should be rehabilitated with new pumps, motors and control systems every 25 years.

The City currently has 8 stations that warrant rehabilitation. The cost to rehabilitate and/or replace these pump stations can range between \$5 million-\$8 million depending on the scope and service needs. Staff is actively working to address these pump station issues. The next pump station to be rehabilitated is the Spreckles Pump station that serves Alviso, with a project award anticipated in 2013.

a. SCADA System Assessment

The City contracted with Schaaf & Wheeler and its electrical sub-consultant, Terada Engineering, in August of 2011, to evaluate its 34 sanitary sewer and storm pump stations to determine the required improvements needed in order to accommodate desired Supervisory Control and Data Acquisition (SCADA) system and Telemetry upgrades.

According to the assessment report, 12 sanitary sewer pump stations and 22 storm pump stations need some level of control panel upgrades and/or electrical updates to 1) meet current Building/Electrical codes, and 2) to be able to receive SCADA system. The preliminary cost estimate for the upgrades is approximately \$3.7 million. Prioritization of work is being reviewed by DOT.

Table 1 – Sanitary Pump Station and Other Facilities Inventory		
<u>Name</u>	<u>Year Built</u>	<u>Year Rehabilitated/Status</u>
Pump Stations		
1. Basking Ridge	2006	Pumps Replaced by DOT in 2011
2. Communication Hill	2007	
3. Gateway	1988	
4. Junction	1979	
5. Lamplighter	1984	Force Main Condition Assessment in Progress
6. Margaret	1952	
7. Montague	1976	Design in Progress
8. Nordale	1960	
9. Nortech	1983	Force Main Condition Assessment in Progress
10. Riddle Park	1982	
11. San Felipe	1989	
12. Spreckles	1975	Design in Progress
13. Tea Garden	1986	Rehabilitated in a1997
14. Happy Hollow Zoo	1967	Reconstructed in 2010
15. Willow	2003	
Other Facilities (Odor Control Stations)		
16. Canoas Ferrous Chloride Injection	1962	Rehabilitated 2009
17. Canoas Soil Bed Filter	1994	
18. Zanker Soil Bed Filter	1995	

SANITARY SEWER PUMP STATIONS & FACILITIES

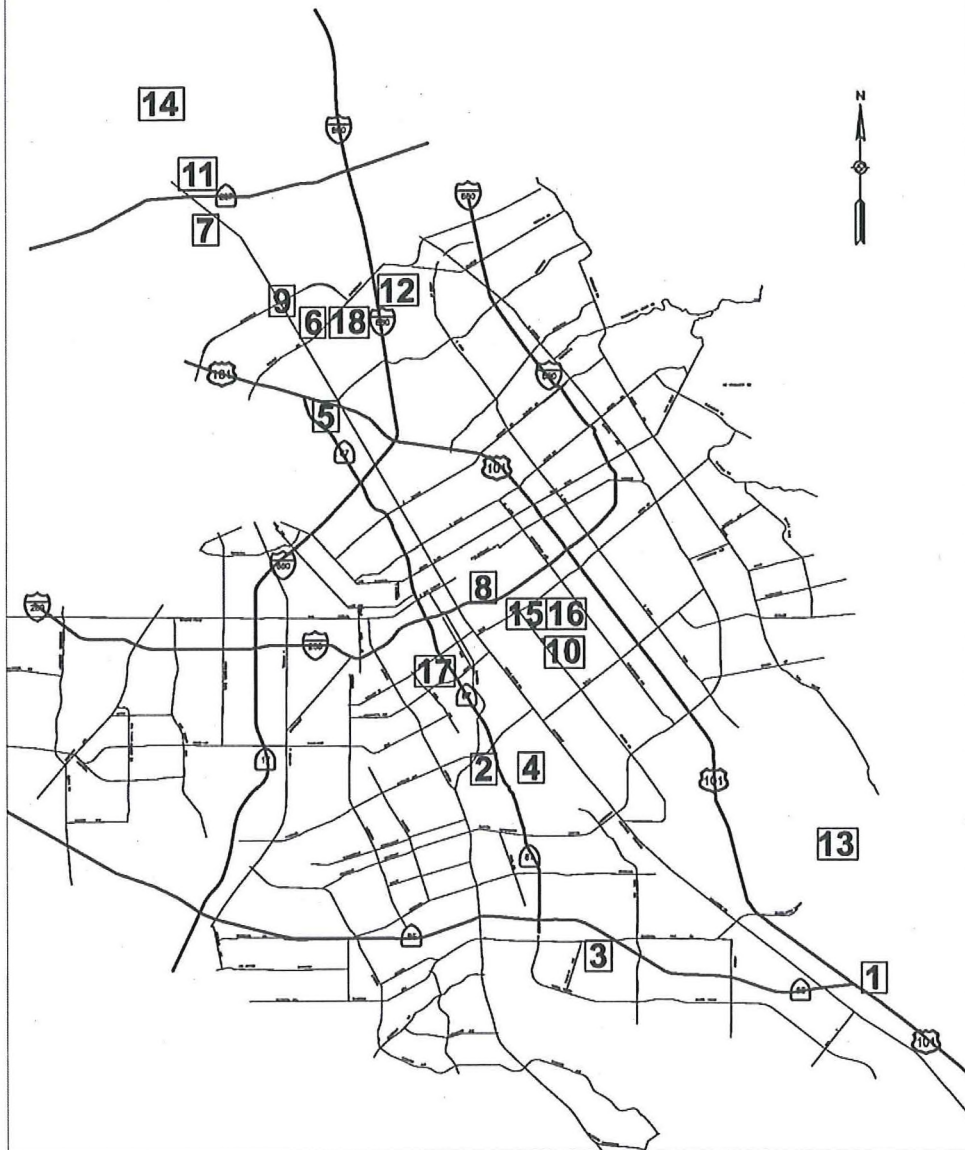


Figure 2

b. Current Sanitary Pump Station Improvement Projects

Padres Pump Station and force main project, just completed, installed a new pump station, electrical and control panels, and a force main and valve system at the intersection of Bird and Minnesota Avenues to address the flat slope conditions. In addition, the project also replaced 2,840 feet of clay pipe with high density polyethylene (HDPE) pipe which is more flexible and can accommodate the soil movement in this area.



Padres Sanitary Pump Station

Spreckles Pump Station and force main are the only means of wastewater conveyance between the Alviso neighborhood and the WPCP. The pump station was constructed in 1977 and replaced in 1991. It consists of two submersible pumps in a wet well. The existing 10-inch force main was built also in 1977 and made of asbestos cement. The project will provide reliable and redundant sanitary sewer services for the Alviso neighborhood by installing 4,000 feet of supplement force main and update the pump station to comply with the 2008 National Electrical Code and improve the reliability of the mechanical equipment of the pump station. The project is anticipated to be in construction in spring of 2013.

Montague Sanitary Pump Station is located at the southeast corner of the intersection of Montague Expressway and North First Street. Built in 1978, the pump station has been “offline” since the mid 1980s. DOT staff exercises the pumps and valves once a month using portable electric generator. The project includes the removal and replacement of the existing pump station. Construction is expected to start in the summer of 2013. When completed, the pump station will be in full time operation and will serve to increase the capacity of the collection system along the North First Street corridor. This increase in capacity is in alignment with the future growth outlined in the Envision San José 2040 General Plan.

IV. INTERCEPTOR MANAGEMENT

Design & Construction

The City's first sewer interceptor dates back to 1867 when the sewer collection system, a redwood box interceptor, was originally constructed from downtown to a discharge location near the Bay. The redwood box interceptor was replaced in 1896 with the 60-inch Brick Interceptor.

The Second (West) and Third (Large) interceptors were constructed in the late 1950's and 1960's respectively. These later interceptors are constructed of Reinforced Concrete Pipe (RCP) and at depths several feet lower than the Brick Sewer. Seven junction structures were also constructed along the interceptor system to equalize and to allow an individual barrel to be removed from service for inspection or repair.

An intensive analysis of the future conveyance needs of the interceptor system was completed in 1986 and recommended the addition of a Fourth Interceptor. Corresponding to the number of junction structures along the alignment, the 1986 study divided the desired improvements into 7 distinct "phases" or "reaches", with 20 sub-phases. The improvements for Phases 1 through 5 are complete and have been constructed since 1989.

Phase 6 is currently in final design with anticipation of a contract award in 2013. The Phase 6 project will allow the final portion (5,400 feet) of the old Brick Sewer to be taken out of service. This reach is along N. 4th Street between Highway 101 and Commercial Street.

The Phase 7 project will complete the build-out of the City's interceptor system with an interceptor rehabilitation project between Commercial Street and Empire Street.

The current interceptor system between the Santa Clara Water Pollution Control Plant and downtown consists of four large diameter (60-inch to 90-inch) sewers. This system conveys approximately 80% of the total wastewater flow to the Plant and is shown schematically in Figure 3 below.

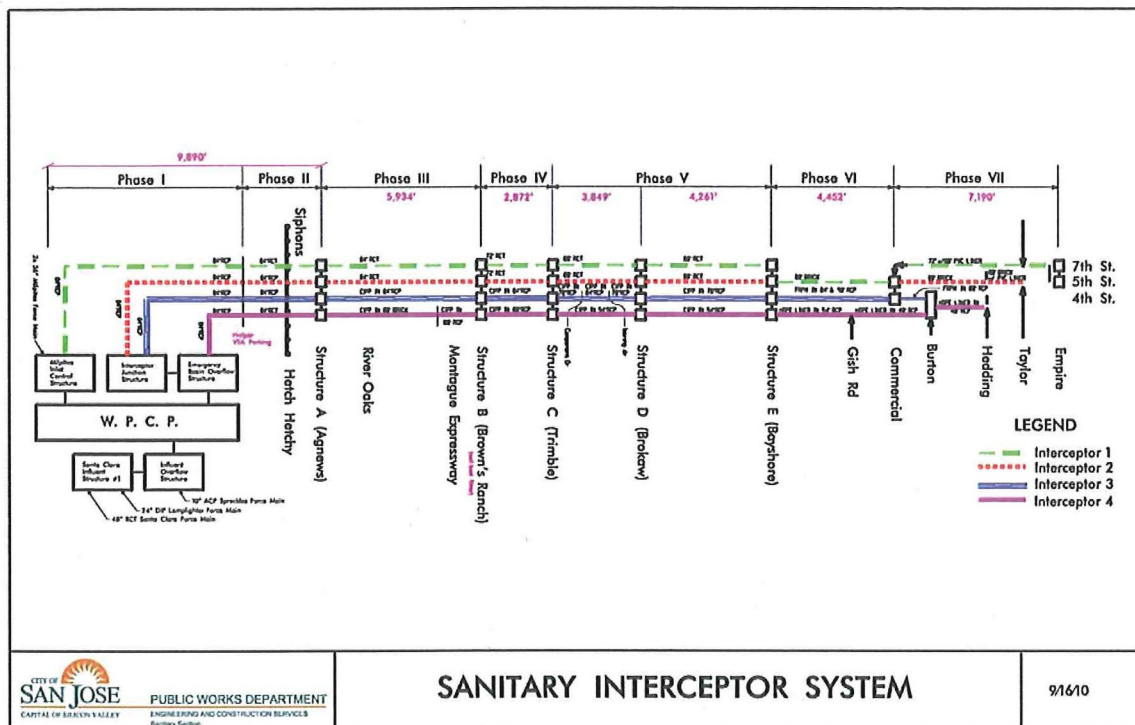


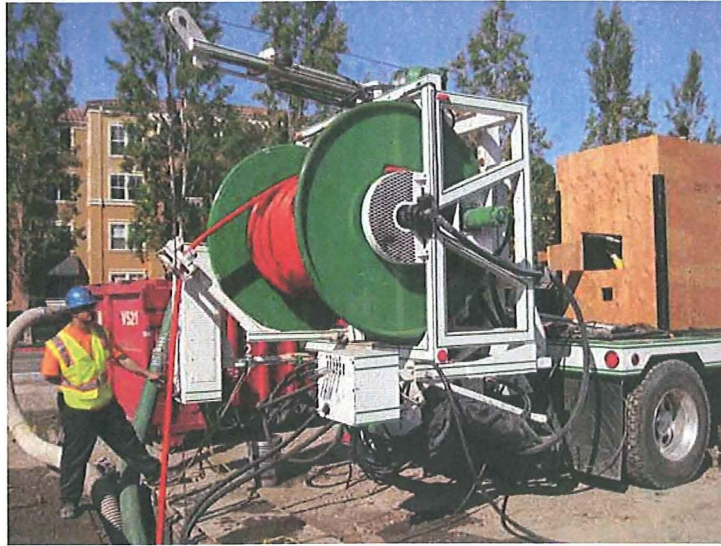
Figure 3

Interceptor Cleaning

The interceptors along Zanker Road with its six siphons were inspected using CCTV and Sonar Imaging equipment. The inspection took place between Structure A (south of Tasman Road) and Structure B (south of Montague Expressway). The inspection results revealed that the six siphons and the downstream segments of the interceptors between the siphons at River Oaks Boulevard and Structure A had an accumulation of grit and sediment after years of service.

On May 24, 2012, the City awarded a \$970,000 sewer cleaning contract to remove accumulated sediments and debris from the interceptors along Zanker Road between Structures A and B, including the six siphons at Montague Expressway and River Oaks Boulevard. This process utilizes specialized equipment to remove the grit from an active interceptor.

The cleaning of the interceptors started in September 2012 and is expected to be completed by January 2013. The contractor is utilizing cleaning equipment which requires no by-pass pumping or sewer diversion hence there is no interruption of service during the cleaning process. In addition to cleaning, the contractor will also perform CCTV and sonar inspection of the cleaned pipes to confirm that at least 95% of the original capacities of the pipelines have been restored. The inspection will also give the City the means to assess the physical condition of the interceptors.



Interceptor Cleaning Operation

Cleaning large diameter sewers can be expensive with costs ranging from \$70 - \$135 per linear foot of pipe. However, this activity is essential to prevent grit and debris accumulation in the system, including inverted siphons where the collection system must siphon under other large infrastructure such as gravity storm sewers or large water aqueducts.

Past large diameter pipe cleaning projects include the Downer Canoas Interceptor Cleaning, where hundreds of feet of 30-inch to 36-inch sewers in the Blossom Valley area were cleaned and video inspected and over 700 cubic yards of grit and precipitate was removed to restore the conveyance capacity of the sewer.

Other operations include shutting down one or two interceptors at a time during low-flow months to force the flow through fewer interceptors, which increases the flow velocity and re-suspends sewer grit to be carried to the WPCP.

V. MASTER PLANNING

Capacity Management

Sanitary sewer collection systems are designed to convey anticipated peak flows, based on current and predicted/planned future demands under both dry weather and design storm (or wet weather event) conditions. The State Water Resources Control Board requires sewer agencies to prepare a System Evaluation and Capacity Assurance Plan to evaluate the capacity of key system components and hydraulic deficiencies and to develop capacity enhancement measures.

In 2002, the City initiated Phase I of the Sanitary Sewer Master Plan project for the City's South, Central and North Areas using the 2020 General Plan. The Phase II Sewer Master Plan (Master Plan) initiated in 2007, studied the two remaining areas (East and West) and re-evaluated the Phase I area study using the updated Envision San José 2040 General Plan.

The Master Plan used current planning documents and state-of-the-art flow modeling techniques to develop an updated capacity assessment of the sewer system and provide an effective tool for planning and design of future improvements to the City's sewer system.

The objectives of the Master Plan:

- Develop a hydraulic model of the sewer system based on updated land use and flow information using the fully-dynamic hydraulic modeling software
- Identify existing and future sewer system capacity deficiencies and a capacity solution
- Develop a prioritized Capital Improvement Program of the capacity improvement projects to address the deficiencies
- Continue to use the master plan to facilitate development and analyze sewer bypass options for capital improvement projects

The Master Plan Phase II identifies 93 capacity improvement projects. Seventy three (73) projects totaling \$134 million are needed to address locations where there is an existing capacity deficiency and some component of future growth. Sixteen (16) projects (\$20 million) will be needed to address near-term and long-term (GP 2040) growth impacts. Based on the level of predicted surcharge (i.e., sewer flow is higher than pipe crown), the projects were divided into five priorities. Priority 1 to 4 projects are to address existing deficiencies. Priority 5 projects were identified to address future deficiencies solely due to future development activities. The locations of the 93 projects are included in the map below (Figure 4)

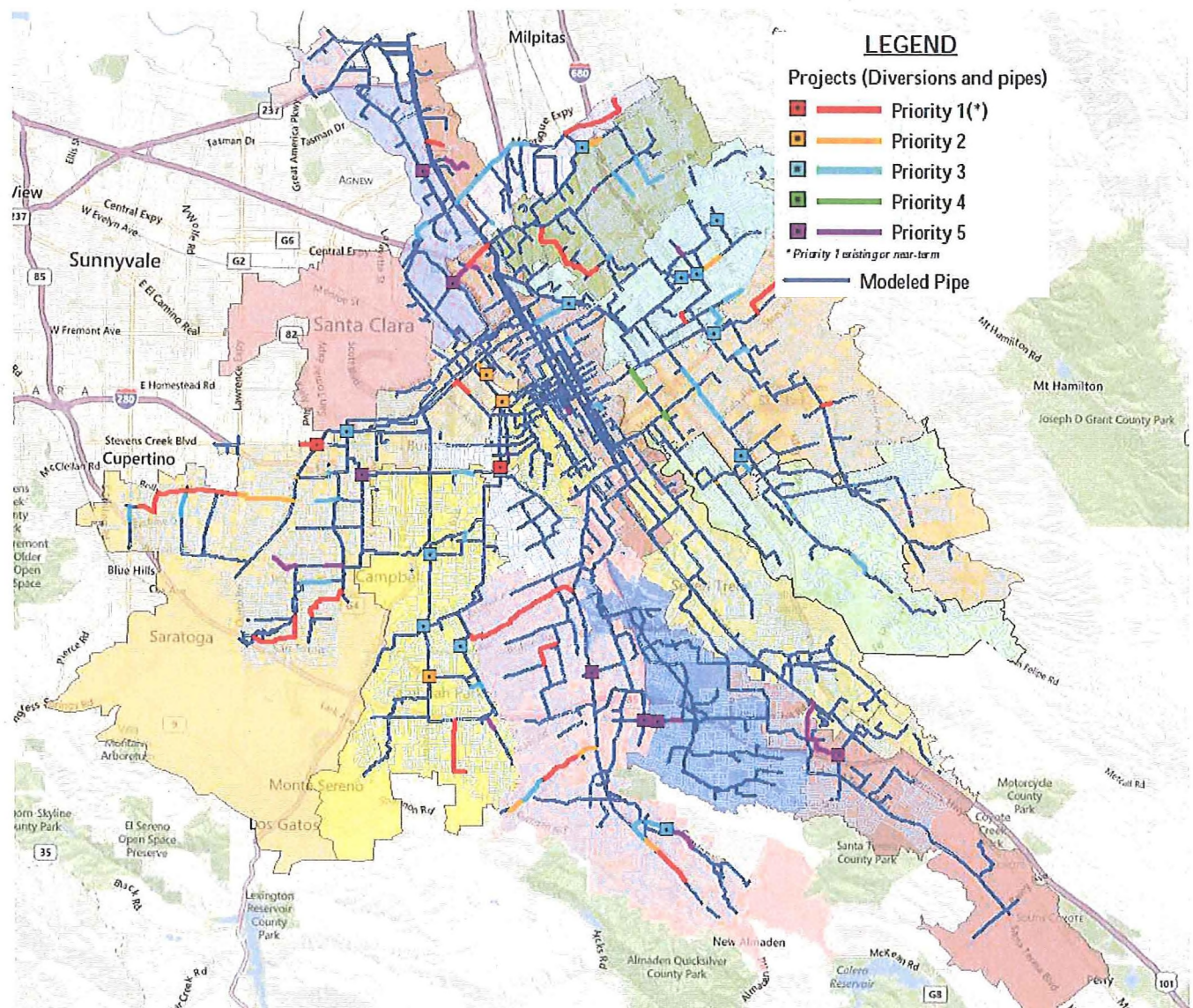


Figure 4

The Master Plan report divided the recommended capacity improvement projects into four CIP groups representing anticipated project timing based on the factor of level of predicted surcharge/overflow (i.e. the Priority) and level of confidence in flow monitoring data. Group 1 represents projects to be implemented in the next five years, Group 2 in the next 10 years, and Groups 3 and 4 in the future years. The estimated capital project cost distribution among the four groups is provided in the following chart (Figure 3).

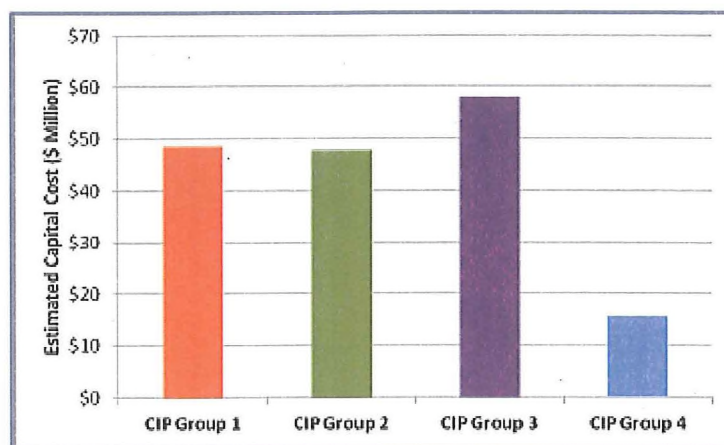


Figure 5

Since the completion of the draft report in late 2011, the City has started to prepare CEQA documentation for the Master Plan in the form of an Initial Study to serve as an Addendum to the Environmental Impact Report for the Envision San José 2040 General Plan Update. The master plan will be finalized along with the completion of this program level Initial Study expectedly in FY12-13.

The North San José Area Sewer Capacity Assessment was conducted soon after completion of the draft report of the Sewer Master Plan. The North San José study focused on the City's North San José Area Development Policy area and extended the Trunk Sewer System model developed under the Phase II project to all smaller pipes (6-inch and 8-inch in diameter) for capacity evaluation. The draft report was completed in June 2012 and is now being reviewed by other City departments and divisions. The final report is anticipated to be completed in FY12-13.

Support for Economic Development

City staff from DPW, DOT and ESD have been working very closely with outside agencies and developers to resolve sewer capacity deficiencies for economic development through the Sewer Master Plan Study and continuous use of the developed trunk system hydraulic model. Assistance was also provided to resolve sewer related issues such as sewer bypass operations prior to and/or during the construction of development projects. Below are some examples.

For the Hitachi Site Mixed Use, iStar Site Mixed Use and other nearby approved development, the Monterey-Riverside Relief Sanitary Sewer (recommended in the Master Plan Study) was programmed in the 5-yr CIP and is being designed by City staff for construction in FY12-13. This project is to relieve the existing capacity deficiency in the Monterey-Riverside Sewer System and to provide additional capacity for future development included in the Envision San José 2040 General Plan.

Collaboratively working with the developer of the Flea Market Mixed Use development, City staff reviewed and re-evaluated the need of upsizing the 1,100 feet of existing 10-inch sewer

on Berryessa Road. With additional information on development and sewer connection details, additional sewer hydraulic modeling analysis was performed to determine that the Berryessa Road sewer project improvement would not be necessary for the Flea Market development.

Requested by Development Services staff, Sewer Master Plan staff re-analyzed the sewer improvement on Jose Figueres Avenue based on additional information provided for the Regional Medical Center development. The computer model suggested the sewer to be upsized to 12-inch instead of the 10-inch size originally recommended in the Master Plan Study.

For the BART project, Sewer Master Plan staff is performing sewer capacity review for the project's Future Development Area 2 based on the updated master plan results and models. Last review was done in December 2010.

For the International Plaza development at the corner of Oakland Road and East Brokaw Road, the developer was conditioned to video-inspect the existing 21-inch sewer under the development site. The developer originally proposed an online bypass operation which would be costly and would require an extensive pumping operation. Upon reviewing the hydraulic model, the City's engineer recommended a bypass solution which would take advantage of the existing flow split on Oakland Road to divert upstream flow to an adjacent sewer through an existing manhole. This solution greatly reduced the complexity, time and cost of the bypass operation. As a result, the bypass setup and video-inspection was completed within a few hours.

VI. PROGRAM FUNDING

Revenues - Adopted FY 2011-12 CIP

Fund 545 - Sewer Service and Use Charge (SS&UC) Fee: A transfer from Fund 541 into Fund 545 of \$31 million is the primary funding source for Sanitary Sewer System CIP.

Fund 540 - Sanitary Sewer Connection Fees: The Sanitary Sewer Connection Fee is charged for connecting to the City's sewer system. These revenues total \$600,000.

Annual transfers from the Sewer Service and Use Charge Fund to the Capital Improvement Fund were increased substantially in FY 2011-2012 from approximately \$14.5 million per year to \$31 million. The transfer for each of the remaining years in the 5-year CIP is currently set at \$25 million. This funding covers most of the rehabilitation needs of the system, but there is a possibility that an increased transfer will be necessary to stay current with the total rehabilitation and capacity needs.

Accomplishments

During the FY11-12, in addition to the completion of the Sanitary Sewer Master Plan, staff has delivered numerous CIP projects with the acceptance of 13 CIP projects in the total contract amount of approximately \$7.5 million and reached beneficial use for 4 additional

projects in the neighborhood of \$4.2 million. These projects result in the following summary of activities:

- Removal and replacement of 24,000 feet of pipe
- Rehabilitation of 10,000 feet of pipe
- Cleaning, videotaping and condition assessment of 351,000 feet of pipe

5-Year CIP Highlights:

- Expenditures for capacity-enhancement projects total \$90.8 million, or roughly 57% of the construction budget for 2013-2017 CIP
- Expenditures for rehabilitation projects total \$68.1 million, or roughly 43% of the construction budget for 2013-2017 CIP

VII. CONCLUSION

The City's sanitary sewer system Capital Improvement Program (CIP) is managed by the Department of Public Works (DPW) and its Operating and Maintenance (O&M) Program is managed by the Department of Transportation (DOT). Increasing regulatory oversight, reducing SSOs and supporting economic development require continued investment in active management, maintenance and improvement of the City's 2,250 miles of piping system.